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ABSTRACT

This paper examines antisocial behavior in children and youth in relation to the biosocial personality theory of Hans Eysenck. It explains Eysenck's theory, which includes a significant role for biological factors in the development of antisocial behavior. The theory holds that three temperament traits--Psychoticism (P), Extroversion (E), and Neuroticism (N)--interact with the environment to produce personality. Eysenck's measurement instruments also contain a Lie (L) scale that has been shown to function as an index of socialization or social conformity. Individuals with antisocial behavior are predicted to be high on the P, E, and N scales. Individuals at greatest risk for developing antisocial behavior are predicted to have above average P-scale scores. Aggressive individuals are predicted to be higher on the E scale than on the N scale, and non-aggressive but antisocial individuals will be higher on the N scale than on the E scale. Individuals at greatest risk for antisocial behavior are also predicted to have below average L-scale scores. An overview of the theory, the possible basis for the temperament traits, and the research support for the prediction is discussed relative to children and youth with antisocial behavior. (Contains 56 references.) (Author/CR)

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Antisocial Behavior in Children and Hans Eysenck's Biosocial Theory of Personality: A Review

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Abstract

Antisocial behavior in children and youth was examined in relation to the biosocial personality theory of Hans Eysenck. Eysenck's theory is a complex theory that includes a significant role for biological factors in the development of antisocial behavior. Eysenck has developed a test with two forms, one for children and one for adults, that can are used to assess personality. Eysenck's test employs three orthogonal factors that reflect hypothesized temperament source traits affecting behavioral predisposition. The theory holds that the interaction of these temperament traits with the environment produce personality. The three temperament traits are Pyschoticism (P), Extroversion (E), and Neuroticism (N). Eysenck's measurement instruments also contain a Lie (L) Scale that has been shown to function as an index of socialization or social conformity. Individuals with antisocial behavior are predicted to be high on the P, E, and N Scales. Individuals at greatest risk for developing antisocial behavior are predicted to have above average P Scale scores. Aggressive individuals are predicted to be higher on the E Scale than on the N Scale and non-aggressive, but antisocial individuals, will be higher on the N Scale than on the E Scale. Individuals at greatest risk for antisocial behavior are also predicted to have below average L Scale scores. An overview of the theory, the possible basis for the temperament traits, and the research support for the prediction is discussed relative to children and youth with antisocial behavior.

Antisocial Behavior in Children and Hans Eysenck's Biosocial Theory of Personality: A Review

The difficulties posed for public school programs by children and adolescents with antisocial behavior disorders (ABD) have been widely debated (Maag, & Howell, 1991; Nelson, Center, Rutherford, & Walker, 1991; Nelson, Rutherford, Center, & Walker, 1991). This debate in education often equates ABD with the educational label "socially maladjusted." Many students with ABD have characteristics similar to those used to diagnose Conduct Disorder (CD), Oppositional Defiant Disorder (ODD), or Antisocial Personality Disorder (APD). The Diagnostic and Statistical Manual of Mental Disorders- Fourth Edition (DSM-IV) (American Psychiatric Association (APA), 1994) characterizes the CD child as a "repetitive and persistent" violator of rules and of the rights of others. DSM-IV describes children diagnosed as ODD as exhibiting ". . . a recurrent pattern of negativistic, defiant, disobedient, and hostile behavior. . ." (APA, 1994, p. 91). Technically, a diagnosis of (APD) cannot be made using DSM-IV criteria until the age of 18; however, inspection of the DSM-IV criteria reveals very similar features for CD and APD. In fact, many children diagnosed as CD are diagnosed as APD when they become adults (APA, 1994). Antisocial and aggressive behaviors are the most common reason for students being placed in special education (Kauffman, 1997, p. 338).

Conduct Disordered children, according to DSM-IV criteria, may exhibit bullying, fighting, weapon use, physical cruelty to people or animals, or theft. According to DSM-IV, there are two subtypes of CD, Childhood Onset and Adolescent Onset. Conduct Disorder of the Childhood Onset Type must be present by the age of ten, is typically found in males, and has the worst prognosis (APA, 1994). Children with Adolescent Onset Type CD usually have more

normal peer relations and their problems are less likely to continue into adulthood. The two subtypes of CD in DSM-IV closely resemble the distinction made between primary and secondary psychopathy (Monte, 1995) and primary and secondary sociopathy (Mealey, 1995) and between psychopathy and sociopathy (Lykken, 1995).

Public school educators are increasingly faced with the complex task of educating children with ABD in regular classroom programs because these students are often excluded from special education services. The basis for excluding these students from special education is the social maladjustment exclusion clause in the federal definition (Center, 1990). Students diagnosed with ABD are not viewed as having an emotional disorder and therefore are not considered to be eligible for special education services (Slenkovich, 1983). The problems exhibited by students with ABD are commonly believed to be the result of an inadequate or inappropriate socialization rather than an emotional disorder (Clarizio, 1987).

The purpose of this review is to examine research based on Hans Eysenck's hypothesis concerning the role of personality in antisocial and aggressive behavior (Eysenck, 1997; Eysenck & Eysenck, 1976; Eysenck & Gudjonsson, 1989). Eysenck's theory of personality is a biosocial theory in which personality is the product of an interaction between temperament and environment. Temperament in Eysenck's theory refers to biological source traits that influence one's behavioral style. The theory predicts that persons with certain personality types are predisposed to and are at greater risk for developing serious ABD than are other personality types (Eysenck, 1967, 1977, 1997; Eysenck & Eysenck, 1976; Eysenck & Gudjonsson, 1989).

Eysenck's Personality Theory

Eysenck's theory, unlike most personality theories, is based on empirically verifiable propositions (Monte, 1995). Eysenck has been critical of non-scientific theories such as those of

Freud and Jung (Eysenck, 1967; Monte, 1995) and believes that personality theory should be based on a hypothetico-deductive approach in which hypotheses are generated and refined based on research findings. Central Nervous System (CNS) functioning plays a pivotal role in Eysenck's theory (Eysenck, 1977). The theory is sometimes referred to as a three factor model of personality in which the three factors are Extroversion (E), Neuroticism (N), and Psychoticism (P).

Extroversion is hypothesized to be dependent upon the baseline arousal level in an individual's Ascending Reticular Activating System (ARAS) (Eysenck, 1967, 1977, 1997). Eysenck thinks differences between people on the E trait are due to differences in the functioning of their ARAS. The ARAS serves to stimulate the brain's cortex to activate its cells to produce a state of excitability. The cortex may in turn generate feedback to the ARAS, which either further increases its excitatory input or dampens it. The model attributes cortical efficiency in learning, conditioning, wakefulness, and attention to the ARAS. The ARAS appears to mediate states of cortical arousal, ranging from sleep to extreme behavioral excitation. Eysenck states that an important function of the cortex is to inhibit the behavioral impulses of the lower brain. Therefore, a highly aroused cortex would function to inhibit behavior. This, it is suggested, is why alcohol disinhibits behavior; i.e., it inhibits or suppresses the functions of the cortex.

In extraverts, high E, the base level of cortical arousal is normally low and less sensitive to stimulation. That is, it takes a more intense stimulus to produce a response in an extravert than in an introvert. Further, the behavior of extraverts is less inhibited than that of persons who have higher basal levels of cortical arousal. In introverts, low E, the basal level of cortical arousal is normally high and more sensitive to stimulation. Thus, it takes a less intense stimulus to produce a response in an introvert. Further, the behavior of introverts is more inhibited than in persons

who have lower levels of cortical arousal. The differences in basal arousal between introverts and extraverts are evident in research on their differential response to drugs. This effect is evident in what is called the "sedation threshold" (Claridge, 1995). Introverts require more of a sedative drug than do extraverts to reach a specified level of sedation. Conversely, extraverts require a smaller dose than do introverts of a sedative drug to reach a specified level of sedation.

Extroverts may be of two types. In the first type, sociable, outgoing and stimulus-seeking behavior predominates and susceptibility to antisocial behavior is similar to that in a normal personality. In the second type, impulsivity and an inability to inhibit aggressive urges and behavior predominate and the risk for ABD is greater. Antisocial behavior disorder is hypothesized to stem from a failure to learn the anxiety-based inhibition that underlies "normal" socialization. The extrovert who develops ABD does so, in part, because his or her cortical and emotional under arousal impedes the learning of anxiety-based self-restraint and moral or ethical inhibitions (Eysenck, 1997)

Neuroticism is hypothesized to be dependent upon an individual's emotional arousability (Eysenck, 1977, 1997). Differences between people on the N trait, it is suggested, are due to differences in visceral brain activation (VBA) which depends upon the hypothalamus and limbic system. The VBA system exerts its effects through the autonomic or involuntary nervous system. The range of neural effects extends from activation of glands and muscles, to heart rate, respiration, and perspiration. The basal level and responsiveness of the VBA system can range from low to high levels of activation. Emotionally stable individuals, low N, are not very susceptible to emotional arousal. Such individuals can remain calm more easily when in emotionally stimulating circumstances. Their low VBA tendencies also make them more resistant to respondent conditioning. Emotionally excitable individuals, high N, are very susceptible to

emotional arousal. Such individuals will become emotionally aroused in situations that most people would have little reaction to. Their high VBA tendencies also make them more susceptible to respondent conditioning. In states of extreme emotional activation, e.g., rage, sadness, or fear, the normal separation of functioning between the ARAS's arousal of the cortex and the VB's emotional activation of the autonomic nervous system breaks down. In effect, the E and N traits lose their independence when an individual is highly aroused emotionally.

There are two types of neurotics. First, there are individuals who are high on the N trait (emotional) who are susceptible to developing neurotic symptoms, such as phobias, obsessions and compulsions, and intense anxiety attacks due to their predisposition for high emotional arousal and increased responsiveness to respondent conditioning. Second, there are individuals who are high on N (emotional) and low on E (introverted) who are at even greater risk. Neurotic symptoms in these individuals are maladaptive responses that are easily acquired due to the combination of high cortical and high emotional arousal, which together facilitates very rapid and strong anxiety conditioning

Eysenck (1976, 1997) thinks the P trait is a polygenic temperament source trait. Polygenic means that a large number of genes, each of whose individual effect is small, may be inherited by a person who will evidence a high degree of the trait they contribute to. Each of these "small effect" genes is additive, so that the total number inherited determines the degree of the P trait in the personality. Another group of genes, fewer in number than the first group and having "large effects," determine the probability that the person will not only evidence the P trait but will also suffer a fully developed psychosis. The person who is high on P has inherited a vulnerability to psychotic disorder but may not in fact succumb to a psychotic illness, particularly when the "large effect" genes are not present. Instead, a person who embodies a large number of

the traits associated with the "small effect" genes who is also high on E and N may develop a pattern of antisocial and aggressive behavior. Aggressive behavior is associated with low cortical arousal because a person with a relatively under reactive nervous system does not condition or acquire the anxiety-based restraints on behavior as readily as do individuals with a higher basal level of cortical arousal. Further, the emotional arousal associated with high N in individuals with high P and E provides an emotional charge to uninhibited behavior when it is exhibited.

Eysenck (1976, 1997) also proposes that high androgen levels have the effect of lowering the arousal levels in the brain's reticular system and contributes to a predisposition for aggression. The evidence for this hypothesis is tentative and controversial. Eysenck also proposed that P is related to differential susceptibility to the effects of testosterone. There appears to be a possible basis for this proposal in the functioning of the amygdala. A behavioral biologist (Sapolsky, 1997) indicates that research evidence suggests that the intensity of aggression appears to be mediated by neuronal signals from the amygdala to the hypothalamus. Sapolsky thinks that the evidence supports a differential sensitivity of the amygdala to testosterone. Thus, a similar level of testosterone in two different individuals might stimulate an aggressive response in one and not the other or aggressive responses in both but of different intensity levels.

It appears that the P trait in personality is the one with the most direct link to the problem of ABD. Research indicates a relationship between high P and diagnoses such as Antisocial Personality Disorders, Schizotypal Personalities, Borderline Personalities, and Schizophrenia (Claridge, 1995; Eysenck & Eysenck, 1976; Monte, 1995). The relationship between psychotic tendencies in high P individuals is indirectly supported by the follow-up research of Robins (1979). Robins found that approximately 25% of individuals with a diagnosis of CD in childhood developed psychotic conditions in adulthood.

Earlier, children and youth with CD were characterized as lacking empathy, being cruel, egocentric and not compliant with rules (APA, 1994). This description is congruent with the description of someone who scores high on Eysenck's P Scale. H. Eysenck and S. Eysenck (1976) characterize the high P individual as cruel, lacking empathy, hostile, and sensation seeking. The most easily identified group that might be expected to include a large number of high P scorers is incarcerated individuals. Thus, a great deal of research with the P Scale has been done on criminals and juvenile delinquents.

Most of this research has been done using instruments developed by Eysenck for assessing the P, E, and N personality traits in adults and children. Research on the Eysenck Personality Questionnaire (EPQ) (Eysenck & Eysenck, 1975, 1993) demonstrates that the P, E, and N traits are orthogonal constructs (Eysenck, 1977; Eysenck & Eysenck, 1976). Lack of orthogonality significantly confounds the interpretation of measures of personality traits (Pedhazur, 1997). Orthogonality means that there are no statistically significant inter-correlation among these traits; i.e., they are independent dimensions (Monte, 1995). The independence of P, E, and N has been demonstrated in numerous studies (Eysenck, 1977; Gabrys et al., 1988; Kirkcaldy & Mooshage, 1993). The one exception to orthogonality is a moderate inverse correlation between P and the Lie Scale (L) on the EPQ (Eysenck, 1977; Gabrys, 1983). The L Scale was initially developed to be a validity check on EPQ responses; however, due to the moderate inverse correlation it shares with P it can also be thought of as a measure of social conformity (Monte, 1995).

Eysenck's theory predicts that individuals high on the P trait will be predisposed to developing antisocial behavior. Further, an individual also high on the E trait will be predisposed to developing antisocial, aggressive behavior. Finally, when an individual is high on the N trait as well, this will add an emotional and irrational character to behavior. Individuals who are high on

the P trait and are higher on the N than on the E trait will be predisposed to developing antisocial behavior but are less likely to develop aggressive behavior. Finally, antisocial individuals typically score lower on the L Scale than others. Hereafter, this will be referred to as Eysenck's antisocial behavior disorder (ABD) hypothesis.

Method

This paper reviews the research on Eysenck's ABD hypothesis that higher than average levels of the P, E, and N traits and lower scores on the L Scale will be associated with antisocial behavior. A literature search was conducted using the PSYCHLIT database. The studies selected for review met the following criteria:

1. The study used child or adolescent subjects.
2. The study examined Eysenck's hypothesis concerning ABD.
3. The research used either the Eysenck Personality Questionnaire (Eysenck & Eysenck, 1975), Eysenck Personality Questionnaire-Revised (Eysenck & Eysenck, 1993), or the Junior Eysenck Personality Questionnaire (Eysenck & Eysenck, 1975).

An evaluation of the abstracts for the studies identified in the PSYCHLIT database yielded 60 articles that appeared to meet the criteria. However, upon a full text review of these articles only 18, inclusive of 21 studies, met all the criteria.

Results

The review of studies examining Eysenck's ABD hypothesis will be divided into two categories; studies utilizing behavioral criteria to differentiate children and youth into groups (e.g., antisocial versus normal) and studies relying on rating scales to categorize the behavior of children and youth. Studies utilizing behavioral criteria often employ school discipline records and records of delinquent offenses such as theft and assault (e.g. Gabrys et al., 1988). Studies employing

rating scales usually have school children as participants. Finally, studies within each category will be reviewed in chronological order for clarity of presentation.

Behavioral Criterion Studies

In an early investigation of Eysenck's ABD hypothesis, Saklofske, McKerracher and Eysenck (1978) studied 13 and 14 year-old schoolboys. Initially the sample contained 150 boys from which were selected two groups, well behaved (n = 40) and badly behaved (n = 40). Students that teachers considered compliant and pleasing to have in class were placed in the well-behaved group. Students placed in the badly behaved group had a history of disrespectful and defiant behavior such as truancy and fighting. Further, teachers described the badly behaved boys as difficult to handle. According to Saklofske et al. (1978) there were no major socioeconomic or racial differences in the sample. Next, the participants were administered the Allsopp and Feldman (1975) 40-item Criminal Propensity Scale (CPS) composed of items from the P, E, and N Scales of the JEPQ. Following the administration of the CPS the well-behaved and badly behaved groups were subdivided into four groups. The new groups were comprised of the 20 highest CPS scorers and the 20 lowest CPS scorers in each of the two original groups. Following the formation of these groups all participants in the four groups were administered the full JEPQ. Next, a new group of 20 randomly selected juvenile delinquents housed in a detention center was added to the study and administered the CPS and the JEPQ. The delinquent group was similar to the school groups in being primarily of European descent.

Scores on the CPS were significantly different between the groups, $F(4, 95) = 21.72$, $p < .001$. Contrasts of the groups with Duncan's new multiple range test indicated that the low scoring well-behaved group ($M = 18.90$, $SD = 4.93$) was significantly ($p < .01$) lower than both the high ($M = 30.80$, $SD = 3.16$) and low ($M = 26.40$, $SD = 5.11$) scoring badly-behaved groups.

The low scoring well-behaved group was also significantly lower ($p < .01$) than the delinquent group ($M = 30.40$, $SD = 5.42$). However, well-behaved boys who scored high on the CPS ($M = 28.35$, $SD = 4.26$) were significantly higher ($p < .01$) than the low scoring well-behaved group. Additionally, badly behaved participants scoring low on the CPS ($M = 26.40$, $SD = 5.11$) were significantly lower ($p < .01$) than the high scoring badly-behaved participants and the delinquent group.

Further, Saklofske et al. (1978) reported that the delinquent group was significantly higher ($p = .01$) on the P, E, and N scales than the well-behaved group scoring low on the CPS. The scores on the P Scale were higher for the delinquent group ($M = 9.60$, $SD = 3.17$) than scores for the well-behaved group ($M = 3.45$, $SD = 2.06$). The E Scale score was higher for the delinquent group ($M = 19.85$, $SD = 3.30$) than for the well-behaved group ($M = 15.45$, $SD = 4.70$). Finally, N Scale scores for the delinquent group ($M = 14.25$, $SD = 4.74$) were higher than those of well-behaved participants ($M = 11.15$, $SD = 4.07$). Also, supportive of Eysenck's hypothesis were elevations in CPS scores in the badly behaved group on the E Scale ($M = 20.85$, $SD = 1.87$) and P Scale ($M = 9.95$, $SD = 3.32$). In fact, participants with high CPS scores in the badly behaved group actually scored slightly higher than the delinquent group on the E and P Scales.

In summary, participants exhibiting the most significant antisocial behavior based on behavioral criteria were the highest on the P, E, and N Scales, which is fully supportive of Eysenck's ABD hypothesis. The lone deviation from Eysenck's hypothesis in this study was the absence of a significant difference on the L Scale between groups. However, the well-behaved boys scoring low on the CPS obtained the highest scores on the L Scale ($M = 3.80$, $SD = 2.33$) in comparison to the other groups. While not significant, this difference was in the predicted direction.

Next, Saklofske and S. Eysenck (1980) examined the Eysenck ABD hypothesis with a group of New Zealand adolescents (N = 117) and a group of delinquent participants (N = 30), from a detention center, who ranged in age from 13 to 15 years. All participants were male. Behavioral criteria were used to separate the non-delinquent participants into a well-behaved group and a badly behaved group. Principals and counselors analyzed participants' school records for the frequency of disciplinary actions. Participants recorded as receiving disciplinary actions were rated by teachers on selected items from the Devereux Adolescent Behavior Scale (Spivak, Haimes, & Spotts, 1967) and for behaviors like truancy and defiance. Badly behaved participants (n = 45) were characterized by frequent disciplinary actions and high scores on the teacher ratings. Participants classified as well behaved (n = 72) had few or no disciplinary actions. All participants were administered the JEPQ and the Antisocial Behavior Scale (ABS), a self-report questionnaire addressing a wide range of antisocial acts (Allsopp & Feldman, 1976). Finally, as in the Saklofske et al. (1978) study discussed above, the CPS was administered (Allsopp & Feldman, 1976).

Results partially supported Eysenck's hypothesis relative to P, E, and L. However, there were no significant differences on the N Scale between any of the groups. The E Scale yielded significant differences between the badly-behaved (M = 20.11, SD = 2.89) and well-behaved (M = 17.75, SD = 4.27) groups, t (df = 115) = 3.26, $p < .01$. Although the delinquent group obtained a higher E Scale score (M = 19.07, SD = 3.67) than the well-behaved group (M = 17.75, SD = 4.27); the difference was not significant, t (df =100) = 1.48. However, the P Scale scores for the delinquent (M = 8.93, SD = 2.95) and well-behaved (M = 6.36, SD = 3.45) groups differed significantly, t (df =100) = 3.57, $p < .001$. A significant difference between the badly-behaved (M = 7.96, SD = 3.57) and well-behaved groups on the P Scale was also found, t (df = 115) 2.41, $p <$

.05. Results for the L Scale were mixed relative to the ABD hypothesis. In support of the hypothesis, the badly-behaved group (M = 1.44, SD = 1.64) obtained significantly lower L Scale scores than the well-behaved group (M = 2.69, SD = 2.51), t (115) = -2.96, $p < .01$. The delinquent group obtained an L Scale score (M = 2.73, SD = 2.77) that was higher than the well-behaved or badly behaved groups. Further, the difference between the lower L Scale score for the badly behaved group and the higher L Scale score for the delinquent group was significant, t (df =73) = 2.53, $p < .05$. The results supported the P Scale component of the ABD hypothesis and offered mixed support for the L and E Scale components.

McGurk and McDougall (1981) examined a delinquent sample for similarities with findings from previous research on Eysenck's ABD hypothesis in adult criminal subjects. Previous research on adult criminals by S. Eysenck, Rust, and H. Eysenck (1977) found a heterogeneous mix of personality profiles in criminals associated with different offenses, such as violent crime and fraud. For example, violent offenders obtained higher P Scale scores (M = 6.11, SD = 4.31) in contrast to their fraudulent counterparts (M = 3.62, SD = 2.60). McGurk and McDougall (1981) also contrasted delinquents with a non-delinquent control group to assess the hypothesized elevations on P, E, N, and depressed L in the delinquent population. The sex of the participants was not specified. Criteria for inclusion in the delinquent group (N = 100) required incarceration for at least three months. The non-delinquent group (N = 100) was comprised of students at a technical college. Participants were described as literate with comparable mean ages, delinquent (M = 17.95, SD = 1.15) and control (M = 17.92, SD = 1.01), with a range of 17 to 20. All participants completed the EPQ, and the raw scores on the P, E, N, and L Scales were subjected to a cluster analysis.

Cluster analysis yielded four clusters in the delinquent and four in the control group. The delinquent sample, like adult criminal samples, was comprised of a heterogeneous mix of personality profiles (Eysenck et al., 1977). A one-way analysis of variance (ANOVA) yielded a significant difference among the delinquent clusters, D1 (n = 32), D2 (n = 26), D3 (n = 30), and D4 (n = 12), on the P, E, N, and L Scales, $p < .001$. The following F ratios were reported for the P (19.701), E (49.419), N (19.221) and L (26.706) Scales. In support of Eysenck's ABD hypothesis, the delinquent sample included two clusters, D3 and D4, that met Eysenck's ABD hypothesis of elevated P, E, and N Scale scores. The following D3 Cluster scores were reported for the E ($M = 17.63$, $SD = 2.01$), N ($M = 14.0$, $SD = 5.03$), and P ($M = 5.67$, $SD = 2.07$) Scales. Elevated scores for the D4 Cluster were reported for the E ($M = 18.08$, $SD = 1.55$), N ($M = 12.5$, $SD = 2.84$), and P ($M = 11.5$, $SD = 2.47$) Scales. However, contrary to Eysenck's hypothesis the delinquent clusters did not have low L Scale scores. The L Scale scores ranged from a mean of 9.65 ($SD = 1.99$) on cluster D2 to 3.8 ($SD = 1.81$) on D3. The control group did not contain a cluster that was elevated on the P, E, or N Scales. McGurk and McDougall did not conduct any cross-group analysis so all contrasts were within-group comparisons, such as D1 versus D3. Further, the researchers did not report data on the types of offenses committed by participants in the delinquent clusters. Thus, the nature of behavioral differences between clusters in the delinquent sample is unclear and limits any comparison to findings in adult criminal samples.

In another evaluation of the ABD hypothesis Gabrys (1983) conducted two separate studies. The first study focused on the validation of the JEPQ in a clinical setting. Only the second study addressed the ABD hypothesis and is relevant to this review. Participants (N = 232) for the study were admissions to individual and family counseling who were then classified as antisocial (n = 116) or prosocial (n = 116). Criteria for inclusion in the antisocial group included

evidence of verbal or physical aggression as well as property rights violations. To be classified as antisocial a participant must have engaged in two or more verbally or physically abusive acts against another person and engaged in two or more community or school property rights violations. Further, the antisocial acts committed must have resulted in "police investigation and a court appearance; or in two or more suspensions from school" (Gabrys, 1983, p. 174). Finally, a child must have been assigned for follow-up care through a court worker, probation officer, or social agency. All participants not meeting the criteria for inclusion in the antisocial group were termed prosocial by default and formed the comparison group. There were 83 males in both groups, with a mean age of 10.76 (SD = 2.11) for the prosocial males and 11.02 (SD = 2.02) for the antisocial males. Similar mean ages were reported for the 33 prosocial and 33 antisocial females, 11.45 (SD = 2.67) and 11.30 (SD = 2.58), respectively.

Gabrys (1983) found significant differences between the antisocial and prosocial groups, in the predicted direction, for the P, N, and L Scales, but failed to find the predicted difference for the E Scale based on multiple t tests. Significantly higher P Scale scores ($p < .001$) were obtained by the antisocial group males (M = 7.63, SD = 2.92) and antisocial group females (M = 6.88, SD = 2.81) in contrast to the prosocial group males (M = 2.57, SD = 1.82) and females (M = 2.30, SD = 1.91). Scores on the N Scale also showed a significant difference between the antisocial and prosocial groups ($p < .001$), with antisocial group males (M = 12.80, SD = 4.13) and females (M = 15.27, SD = 4.19) obtaining higher scores than the prosocial group males (M = 10.16, SD = 5.41) and females (M = 12.91, SD = 4.47). Further, the male and female antisocial group participants obtained significantly lower ($p < .001$) L Scale scores in comparison to the prosocial group male and female participants. The antisocial group males' L Scale scores (M = 4.29, SD = 3.13) were almost half the mean score obtained by prosocial group males (M = 7.94, SD = 5.34).

There was also a difference between prosocial group females (M = 5.85, SD = 3.71) and antisocial group females (M= 4.70, SD = 3.08) on the L Scale.

McEwan (1983) cluster analyzed the EPQ profiles of 186 juvenile offenders aged 14-17 (M = 15.59, SD = 0.79). The sex composition of the sample was not reported. The analysis produced four separate clusters; C1 (n = 60), C2 (n =23), C3 (n = 66), C4 (n = 37). Analysis indicated statistically significant differences among the clusters ($p < .001$) with the following F values reported for the differences on the P (44.40), E (86.76), N (29.82), and L (20.64) Scales. Results confirmed the heterogeneity of the delinquent population as discussed by Eysenck and Gudjonsson (1989). Two of the clusters overlapped the ABD hypothesis on two of the four EPQ Scales. Cluster two, (C2), was elevated on the P (M = 11.09, SD = 2.86) and E (M = 17.35, SD = 1.47) Scales, and cluster three, (C3), was elevated on the E (M = 16.38, SD = 2.01) and N (M = 15.68, SD = 2.93) Scales. McEwan did not discuss the L Scale but the reported values appear to support the ABD hypothesis. Specifically, C2 yielded low L scores (M = 3.26, SD = 2.36) as well as elevated P and E Scale scores as noted above. Scores were classified as high or low by deviating from the overall sample by 1.5 scale points and meeting score cut-off points given in the EPQ test manual. A Kruskal-Wallis one-way ANOVA was used to test for differences between the clusters on the mean number of previous convictions. Results indicated a significant difference between clusters, H = 10.88, $p < .05$. As predicted by the ABD hypothesis, the cluster with the highest P Scale scores, C2, had more previous convictions (M = 3.22). Specifically, C2 was significantly different from C3 ($z = -2.01$, $p < .05$) and C4 ($z = -2.61$, $p < .01$). The Mann-Whitney U test was used for post-hoc analysis. Finally, a discriminant function analysis was performed and accurately classified all members of C2 based on scores and convictions.

Another cluster analysis study conducted by McEwan and Knowles (1984) examined an incarcerated juvenile population aged 17-20 (N= 102), 91 were serving three month sentences and 11 were serving six month sentences. According to McEwan and Knowles the participants were literate and had a mean age of 18.5 (SD = 0.99). The sex of the participants was not reported. Groups of participants were administered the EPQ and individually administered a semi-structured interview about the nature of their offenses. The interview was focused on examining situational factors affecting offenses.

Cluster analysis generated four separate clusters, C1 (n = 27), C2 (n = 25), C3 (n = 36), and C4 (n = 14). A one-way analysis of variance indicated significant differences ($p < .001$) between clusters on the P, E, N, and L Scales. Differences between the clusters had the following F values for the P (24.98), E (36.03), N (29.55), and L (20.08) Scales. The results indicated a great deal of heterogeneity in the delinquent sample on the EPQ. High and low scores were defined as being separated by at least three points and meeting the cut-off points for high and low scores in the EPQ test manual (Eysenck & Eysenck, 1975). One of the clusters, C1, had the hypothesized ABD profile, namely high P (M = 8.11, SD = 1.85), E (M = 16.85, SD = 2.36), and N (M = 15.33, SD = 2.70) Scale scores. Cluster One also had a low L Scale score (M = 3.52, SD = 1.93) which was not discussed by the authors but fits the ABD profile. The number of convictions was highest for C1 (M = 3.55, SD = 2.04), the cluster most like Eysenck's hypothesized ABD profile. The number of convictions was lowest for C3 (M = 2.67, SD = 1.80), the cluster yielding the lowest mean P (M = 3.28, SD = 2.16) Scale score. However, the differences across all clusters on number of convictions was not statistically significant based on a Kruskal-Wallis one-way ANOVA, H = 2.49, p = 0.48. A follow-up, non-parametric analysis of

cluster pairs also failed to yield significant differences in number of convictions, $z = -1.56$, $p = 0.12$.

Berman and Paisey (1984) conducted a study comprised of 30 assaultive and 30 non-assaultive male juvenile offenders. The participants were 60 offenders in a juvenile detention center who were grouped by assaultive offenses characterized by "personal contact with a victim during commission of the offense" (Berman & Paisey, 1984, p. 528) or non-assaultive offenses such as theft and a record devoid of assaultive offenses. The participants in the two groups were 14 to17 years old and were matched for age and ethnicity. Berman and Paisey found a personality profile in assaultive delinquents consistent with Eysenck's ABD hypothesis, i.e., elevated P, E, N, and depressed L Scale scores (Eysenck & Gudjonsson, 1989). A multivariate analysis of variance (MANOVA) indicated the greatest elevation was on the P Scale of the EPQ, with the assaultive offenders having a higher mean score ($M = 9.03$, $SD = 3.77$) than the non-assaultive offenders ($M = 4.90$, $SD = 2.55$), $F(1, 58) = 24.70$, $p < .05$. The differences between assaultive and non-assaultive offenders on the E, N, and L Scales were also significant ($p < .05$), although not as large as differences on the P Scale. Specifically, the means reported for the EPQ's E, N, and L Scales for the assaultive offenders were; 14.03 ($SD = 3.11$), 13.47 ($SD = 2.98$), 7.67 ($SD = 3.86$) respectively. The EPQ means for non-assaultive offenders on the E, N, and L Scales were 12.10 ($SD = 4.10$), 11.47 ($SD = 4.24$), and 10.17 ($SD = 3.58$) respectively.

Further, Berman and Paisey administered the Zuckerman Sensation Seeking Scale (Zuckerman, 1979) to assess differences in thrill seeking and disinhibition between the two groups of offenders. Assaultive offenders had a significantly elevated mean score on General Sensation Seeking ($M = 22.70$, $SD = 3.48$) in contrast to non-assaultive offenders ($M = 13.37$, $SD = 3.85$), $F(1, 58) = 97.00$, $p < .05$. The high sensation seeking scores for assaultive subjects are

consistent with the low cortical arousal, behavioral disinhibition, and impulsiveness associated with elevated E Scale scores in Eysenck's theory (Eysenck & Gudjonsson, 1989; Monte, 1995).

Silva, Martorell, and Clemente (1986) conducted a number of studies to assess personality in pre-adult Spanish samples. The JEPQ and the Antisocial Behavior Scale (ABS) (Allsopp & Feldman, 1976) were administered. In one study, 42 incarcerated delinquents were compared with a control group of 103 non-delinquents. There was no differentiation within the delinquent group for type of offense. Participants were all male and matched for age (M = 13.1). The results supported Eysenck's hypothesis relative to the P and N Scales on the JEPQ. There was a significant difference between the groups on E, but not in the predicted direction. The P Scale scores were significantly higher in the delinquent group (M = 6.60, SD 2.97) than the non-delinquent group (M = 4.56, SD = 3.46), t (143) = 3.57, $p < .001$. The N Scale scores were also significantly higher for the delinquent group (M =12.40, SD = 3.54) than for the non-delinquent group (M = 10.50, SD = 4.67), t (143) = 2.66, $p < .01$. Contrary to prediction, the non-delinquent group obtained higher E Scale scores (M = 18.22, SD = 3.41) than the delinquent group (M = 16.86, SD = 3.20), and the difference was significant, t (df =143) = 2.28, $p < .05$.

Also supporting Eysenck's hypothesis, scores on the ABS were significantly higher for delinquents (M = 21.21, SD = 4.03) than for non-delinquents (M = 18.97, SD = 4.59), t (df =143) = 2.91, $p < .01$. Delinquents scored significantly higher on the ABS (M =32.28, SD = 10.20) than non-delinquents (M = 14.07, SD = 10.45), t (df =143) = 9.68, $p < .001$. Overall the results of the Silva et al., study support Eysenck's hypothesis, with the exception of the contrary findings for the E Scale.

Lane (1987) conducted a series of studies but only two assessed Eysenck's ABD hypothesis and are pertinent to this review. The second study offered a predictive, longitudinal

perspective that makes it unique among the ABD studies reviewed. In the first study, a random sample of participants from several schools (N = 120) were placed into no problem (n = 40), some problem (n = 40), and severe-problem (n = 40) groups based on meeting specific behavioral criteria. The participants in each group, 20 boys and 20 girls were matched for age. Participants were placed in the no-problem group based on having no record of behavioral difficulties. The participants in the some-problem group were characterized by less than one reported infraction per week. Further, to be placed in this group the school could not be seeking outside help for the student. The severe-problem group was comprised of students with at least one reported infraction per week and who were receiving or had been offered additional support. All participants were administered the EPQ rather than the JEPQ, but there is no specific mention of the age of the participants, who are merely referred to as children.

The results of a two-way ANOVA indicated significant differences between groups on the P, E, N, and L Scales. The differences found were in the predicted direction on the P, E, and L Scales, with higher scores for the problem students on the P and E Scales and lower scores on the L Scale. The most significant difference was on the P Scale, $F(3, 116) = 29.00$, $p < .001$. The following mean scores were obtained for the no-problem (2.53), some-problem (4.50), and severe-problem (5.08) groups. There also was a significant elevation on the E Scale for the severe-problem ($M = 17.28$) and some- problem ($M = 17.90$) groups in contrast to the no-problem ($M = 15.73$) group, $F(3, 116) = 3.81$, $p < .025$. Further, as predicted the mean L Scale scores were significantly lower for the severe-problem ($M = 5.40$) and some-problem ($M = 5.55$) groups in contrast with the no-problem group ($M = 8.18$), $F(3, 116) = 7.16$, $p < .001$. Contrary to prediction, the mean N Scale score was significantly higher for the no-problem group ($M =$

13.60) in contrast with the some-problem (M = 12.08) and severe-problem (M = 11.00) groups, F (3,116) = 3.30, $p < .04$.

The second study by Lane (1987) provided an opportunity to assess the predictive validity of the EPQ for delinquency. Specifically, 60 participants who had completed the EPQ and who subsequently exhibited delinquent behavior, which was defined as a legal conviction, during the following 5 years were contrasted with 60 participants without convictions. The participants, with and without convictions, were matched for age, sex, and social class. However, no specific age range or indication of the range of social classes was provided. Eysenck's ABD hypothesis predicts higher P, E, N, and lower L Scale scores for the convicted group.

A MANOVA indicated that the P and L dimensions were directly in line with predictions. The convicted group was significantly elevated on the P Scale (M = 6.03, SD = 2.80) in comparison to the no convictions group (M = 2.92, SD = 2.08), T (df = 58) = 7.10, $p < .001$. Next, the mean L Scale score was significantly lower for the convicted group (M = 5.58, SD = 3.56) relative to the no convictions group (M = 7.63, SD = 3.78), T (df = 58) = -2.90, $p < .005$. Thus, elevated P and low L Scale scores were predictive of subsequent delinquency in the sample. However, no significant difference was found between the convicted (M = 17.73, SD = 3.95) and no convictions groups (M = 17.15, SD = 3.89) on the E Scale, T (df =58) = .75, $p < .458$. Further, the N Scale indicated a significant difference between groups, but in the opposite direction of Eysenck's prediction, T (df = 58) = - 3.60, $p < .001$. The no convictions group attained a higher mean N score than the convicted group, M = 12.83 (SD = 4.18) and M = 10.07 (SD = 4.32), respectively. Based on his results, Lane (1987) suggested an alternative hypothesis for the role of Neuroticism in delinquency. Lane suggested that delinquents have less anxiety

about antisocial behaviors than non-delinquents do and this is reflected in their lower N Scale scores.

Finally, Lane (1987) conducted an analysis of the P, E, N and L Scale scores for the delinquents in the second study relative to severity, persistence and violence of offenses. Severity was based on the number of convictions over 10 years. Persistence was determined by the interval between the first and last conviction. Violence was based on one or more convictions for a violent offense. As predicted, the P Scale was significantly and positively correlated with severity (r = .342, p < .004), persistence (r = .24, p < .032), and violent behavior (r = .233, p <.037) among delinquents. Further, the L Scale was significantly and negatively correlated with violent behavior (r = -. 35, p < .003) and approached significance for severity of offenses (r = -.183, p < .081). However, the E and N Scales failed to yield any significant correlation with the severity, persistence, or violence variables.

In a follow-up to Gabrys (1983), Gabrys et al. (1988) employed a sample of 684 children referred to a mental health center for services or evaluation. The sample was divided based on the presence or absence of CD related characteristics, e.g., physical or verbal aggression, violation of property rights, court appearances, school suspensions, and referral to a legal agency. To qualify for the CD group a participant had to meet all of the above characteristics. Three hundred-thirty children, 244 boys and 86 girls, met the CD criteria and comprised the CD group. The balance of the sample, 238 boys and 116 girls, formed the contrast group. The participants were administered the JEPQ. The conduct disorder group differed significantly (p < .001) from the control group on the P, N, and L Scales with t scores (df = 682) reported as 21.76, 8.72, and 15.76 respectively. A significant difference was also detected on the E Scale, t (df = 682) = 1.96, p < .05. Further, the control group exhibited significantly higher L Scale scores than the conduct

disordered group, t (df = 682) = 15.76, $p < .001$. All differences were in the predicted direction with elevated P, N, and E and depressed L Scale scores in the CD group. The P Scale mean was significantly higher in the conduct disordered group (M = 7.79, SD = 3.48) than the control group (M = 2.81, SD = 2.35), t (682) = 21.76. The conduct disordered group had a higher N Scale mean (M = 13.24, SD = 4.44) than the control group (M = 10.18, SD = 4.72). Further, the control group's L Scale score mean (M = 9.53, SD = 4.67) was higher than the mean for the conduct disordered group (M = 4.67, SD = 3.31).

Chico and Ferrando (1995) examined a sample of violent offenders, non-violent offenders, and soldiers with a revision of the EPQ P Scale (Eysenck, Eysenck & Barrett, 1985). Their sample was comprised of 300 male prisoners with a mean age of 19.9 (SD = 3.8) and an age range of 18 to 30 and 300 male soldiers with a mean age of 19.1 (SD = 0.8) and an age range of 18 to 23. The 300 prisoners were matched with soldiers for age, level of education, and Raven Matrices score. The researchers described their sample as medium to low in intellect and exhibiting no reading problems. Participants were administered a Spanish language version of the revised P Scale. The prisoner group, was divided into violent (n = 181) and non-violent (n = 119) groups to compare scores on the P Scale. A one-way ANOVA indicated that the groups were significantly different (F = 56.9, sig. = .000), and a Scheffe test indicated significant differences between violent offenders and non-violent offenders as well as violent offenders and soldiers. However, no specific significance levels for the differences between groups were provided. The violent offenders obtained the highest P Scale scores (M = 10.42, SD = 3.79) followed by soldiers (M = 7.22, SD = 3.55) and non-violent offenders (M = 6.76, SD = 3.01). Chico and Ferrando's (1995) results provide additional support for the P Scale's ability to differentiate between violent and non-violent groups.

Fonseca and Yule (1995) reported two separate studies on Eysenck and Gray's theories of antisocial behavior. In the first study, male inner city delinquents (n = 44), court referred to an assessment center, and non-delinquents (n = 20), participating in community youth organizations, were studied. Further, the delinquent group was divided into two sub-groups, aggressive (n = 22) and non-aggressive (n = 22), using behavioral criteria. Participants in the aggressive group had records of violent offenses such as; murder, rape, assault, robbery, physical and verbal abuse. Non-aggressive delinquents had records of infractions such as; theft, shoplifting, lying, and disobeying. The participants were between the ages of 12 and 15 (M = 14.6, SD = 12.4) with a mean IQ of 91 (SD = 10.28). The participants in both the aggressive and non-aggressive groups were matched for age and IQ. The control group participants were between the ages of 11 and 15 (M = 13.8, SD = 16.3) with a mean IQ of 94.7 (SD = 10.23) and no reported criminal convictions. All participants, delinquent and non-delinquent, were from low socioeconomic homes.

A series of one way analyses of variance and post hoc contrasts yielded no statistically significant differences between the groups on P, E, N or L. Scores obtained on the P Scale were highly similar for all groups and were reported as; aggressive delinquents (M = 5.50, SD = 3.11), non-aggressive delinquents (M = 5.36, SD = 2.79), and controls (M = 5.15, SD = 3.45). The E Scale scores were reported as; aggressive delinquents (M = 18.72, SD = 3.70), non-aggressive delinquents (M = 18.86, SD = 4.89) and controls (M = 18.05, SD = 4.83). Similar scores were also obtained on the N Scale for aggressive delinquents (M = 11.72, SD = 4.86), non-aggressive delinquents (M = 12.27, SD = 3.56) and controls (M = 11.40, SD = 3.77). Finally, the aggressive delinquents scored lower on the L Scale (M = 5.00, SD = 3.51) than the non-aggressive (M =

6.59, SD = 4.86) and control (M = 6.80, SD = 4.90) groups. However, the difference was not statistically significant.

There are a couple of things to consider about the somewhat anomalous results in this study. First, all participants were from a low SES, inner city background. Environment is considered to be an important interactive factor in biosocial theory (Eysenck & Gudjonsson, 1989) and poor environments can affect socialization outcomes independent of temperament. Given these considerations, it would have been useful had Fonseca and Yule employed an additional screening criterion to select their control subjects, e.g., a self-report delinquency scale or a teacher/parent behavior rating scale to help ensure that lack of convictions in fact meant a lack of behavioral problems. In fact, they did do this when selecting control subjects for their second study reported below. Second, it should be noted that although it did not reach significance the differences in P Scale scores were in the predicted direction and were all above the mean based on the test manual norms. In fact, the aggressive delinquent group was a little over a quarter of a standard deviation above the mean and the non-aggressive delinquents were just under a quarter of a standard deviation above the mean.

In the second study conducted by Fonseca and Yule (1995), an antisocial group (n = 27) was comprised of male participants from both a special school for severely disturbed children in London (n = 14) and referred outpatients or inpatients (n = 13) at Maudsley Hospital. Participants from the special school were described as meeting the criteria for a DSM-III-R (APA, 1987) diagnosis of Conduct Disorder. Behaviors exhibited by this group included verbal and physical assault as well as destruction of property. The Maudsley Hospital participants were all diagnosed as Conduct Disordered based on the ICD-9 (World Health Organization, 1978) or Conduct Disordered with Emotional Disturbance. Additionally, the Conduct Disordered group,

comprised of participants in special school and hospital settings, had elevated antisocial behavior scores on the Rutter Questionnaire for Teachers (Rutter, 1967). Conduct Disordered participants were ages seven to 11 years (M = 9.8, SD = 11.8) with homes ranging from low-income through middle class. The control group (n = 26) of male participants ranged in age from seven to 11 (M = 9.7, SD = 1.1) and were selected from a primary school. The control participants were predominantly from middle class homes and had no behavioral difficulties at school. Scores on the Rutter Questionnaire for Teachers corroborated the lack of behavioral difficulties. The mean IQ of the conduct disordered group (M = 95.0, SD = 13.6) was significantly lower than the control group (M = 107.4, SD = 13.4), F (1, 51) = 11.51, $p < .05$.

The results for the second Fonseca and Yule study provided partial support for Eysenck's ABD hypothesis with elevated N Scale scores in the Conduct Disordered group. Participants with Conduct Disorder were significantly higher than the control participants on the N Scale with the following average scores reported, Conduct Disorder 13.37 (SD = 3.79) and control 10.88 (SD = 3.80), F (1, 48) = 5.35, $p < .05$. Participants with Conduct Disorder had only marginally higher scores on the E (M =18.54, SD = 3.45) and P (M = 5.91, SD = 3.06) Scales than control participants, with E Scale scores of 17.92 (SD = 3.74) and P Scale scores of 4.65 (SD = 3.24). Finally, the L Scale scores were similar across the two groups with a control group mean of 10.57 (SD = 3.54) and Conduct Disorder mean of 10.25 (SD = 5.39). The findings in the Fonseca and Yule studies are contrary to all other studies reviewed. Their studies are the only ones that found no statistically significant elevation on the P Scale in delinquent, aggressive, or conduct disordered adolescents.

Again, there are a couple of points to consider about the puzzling findings in this second study. In this second study, the experimental subjects came from both lower and middle SES

backgrounds while the control subjects were reported as being predominately from middle class backgrounds. Failure to match subjects in the groups for SES background may confound interpretation of this study for reasons already mentioned. More care was apparently taken in this second study in evaluating the behavioral status of control subjects. Second, it should be noted that, as in the first study, the difference in mean P Scale scores was in the predicted direction, and for the CD subjects was approximately one-half standard deviation above the norms in the test manual.

Rating Scale Studies

S. B. G. Eysenck (1981) examined the correlation between antisocial behavior and the P, E, N and L Scales of the JEPQ with a sample of 407 school children. Participants in the study were predominantly female (n = 306) with a mean age of 14.09 (SD = .68) who attended school at a North London girls' school. Male participants (n = 101) had a mean age of 13.26 (SD = .44) and were drawn from two London comprehensive schools. There was no data reported on the academic level, intelligence, or social behavior of the participants. Participants completed the JEPQ and the Antisocial Behavior Scale (ABS) of Allsopp and Feldman (1976).

The results supported Eysenck's ABD hypothesis, with one exception, i.e., a lack of correlation between antisocial behavior and N Scale scores in male participants. Significant correlation between antisocial behavior, as measured by the ABS, and the P Scale was found for both males (r = .55, p < .01) and females (r = .51, p < .01). Further, significant correlation was obtained between the ABS and the E Scale for both males (r = .28, p < .01) and females (r = .31, p < .01). Finally, L Scale scores had a significant negative correlation with ABS scores for both males (r = -. 65, p < .01) and females (r = -. 63, p < .01). Correlation between the N Scale and

the ABS were mixed, with male ABS and N Scale scores failing to reach significance (r = .14, p = ns) and female ABS and N Scale scores being significantly correlated (r = .27, p < .01).

Powell and Stewart (1983) examined the relationship between children's teacher reported antisocial behavior and personality as measured by the JEPQ. Participants in the study were 808 students from three secondary schools and four junior schools in a large provincial town. The secondary school participants (n = 414), with 219 females and 195 males, ranged in age from 11 to 15 (M = 13.3). The junior school participants (n = 394), with 208 females and 186 males, ranged in age from eight to 10 (M = 9.4). The participants were all white and middle class. Participants completed the JEPQ to assess personality. Teachers rated participants on the 26 item Teachers' Rating Scale (TRS) designed by Rutter (Rutter, 1969; Rutter, Tizard, & Whitmore, 1970). The TRS provides three scores. The TRS Total Disturbance score obtained from all 26 items indicates the overall level of behavioral disturbance. The TRS Antisocial score comprised of six scale items indicates the level of antisocial behavior (e.g., property destruction or bullying). The TRS Neurotic score comprised of four items indicates the level of neurotic behavior (e.g., worried or fearful).

Prior to analysis participants were sorted based on their TRS scores. Participants were divided into three groups using the TRS Overall Disturbance score. Group one (n = 404) had no teacher endorsed items. Group two (n = 207) had one to eight items endorsed which indicated moderate disturbance. Group three (n = 150) had nine or more items endorsed indicating possible psychiatric disturbance. For an analysis of antisocial behavior participants were divided into two groups. The first group (n = 615) had a zero TRS Antisocial score. The second group (n = 146) received a score of at least one for the TRS Antisocial score. Finally, for an analysis of neurotic behavior participants were also divided into two groups. The first group (n = 488) had a zero

TRS Neurotic score. The second group (n = 273) received a score of at least one for the TRS Neurotic score.

A MANOVA was computed using the Total Disturbance score, Antisocial score, and Neurotic score on the TRS. Results indicated a significant main effect for the Total Disturbance score and the P Scale on the JEPQ, F (2, 722) = 14.4, $p < .0001$. Further, a significant main effect for the TRS Antisocial score and the P Scale was obtained, F (1, 722) = 12.5, $p < .001$. Total Disturbance (F = 3.6), Antisocial (F = 4.2) and Neurotic (F = 6.3) scores on the TRS all yield significant main effects ($p < .05$) with the L Scale. The main effect for the TRS Neurotic score with the N and P Scales was not significant, F (1, 722) = 0.0 and F (1, 722) = 1.2, respectively. However, a significant main effect for the TRS Neurotic score with the E Scale was noted, F (1, 722) = 4.2, $p < .05$. The results of this study indicated that participants rated with high overall levels of behavioral problems and antisocial behavior were elevated on the P Scale as hypothesized by Eysenck. Further, as predicted children with elevations in antisocial behavior exhibited lower L Scale scores.

Slee and Rigby (1993) examined the ABD hypothesis by contrasting a group of children exhibiting bullying behavior with children who were victims of bullying and with children who were neither bullies nor victims. The sample was comprised of male students from three primary schools and ranged in age from seven to 13 (M = 10.9). All prospective participants completed a questionnaire containing a Bully and a Victim Scale designed by Rigby and Slee (1991) that contained four questions each on bullying behavior and on victim behavior. Classroom teachers were asked to nominate six students: two bullies, two victims, and two students who were neither. No specific teacher criteria for selecting bullies or victims were provided. The bullies group (n = 29) was based on teacher nomination, a score greater than nine on the Bully Scale, and

a score less than eight on the Victim Scale. Victims (n =29) were teacher nominated, scored less than nine on the Bully Scale, and greater than eight on the Victim Scale. The bully and victim groups were contrasted with 29 students who did not meet the criteria for either the bully or victim groups. All participants completed the JEPQ and the Coopersmith Self-Esteem Inventory, but only the JEPQ results will be discussed.

Consistent with Eysenck's ABD hypothesis, a one way ANOVA indicated that the bully group had significantly elevated P Scale scores ($p < .05$) relative to the victim and control groups. The mean P Scale score for the bully group ($M = 5.72$, $SD = 3.44$) was more than double that of the victim group ($M = 2.72$, $SD = 2.12$). The control group was intermediate on the P Scale ($M = 3.41$, $SD = 3.82$). Further, consistent with Eysenck's ABD hypothesis significantly lower L Scale scores ($p < .05$) were obtained for the bully group ($M = 6.27$, $SD = 4.30$) than for the victim group ($M = 10.58$, $SD = 3.99$). The control group was intermediate on the L Scale ($M = 8.31$, $SD = 4.35$). Scores on the E Scale were significantly higher ($p < .05$) for both the bully group ($M = 20.93$, $SD = 2.46$) and control group ($M = 20.31$, $SD = 3.30$) compared to the victim group ($M = 17.52$, $SD = 5.51$). Thus, the E Scale differences were in the predicted direction when comparing the bully group with the victim group but not in the comparison of the bully group with the control group. There were no significant differences between any of the groups on the N Scale: bully group ($M = 11.00$, $SD = 4.25$), victim group ($M = 10.66$, $SD = 4.91$), and control group ($M = 9.17$, $SD = 4.50$).

Heaven (1993) examined personality and self-reported delinquency in two studies with participants selected from the general population. He administered portions of the short form of the EPQ (Eysenck et al., 1985) in both studies, but did not administer the entire instrument in either study. He also administered the Australian Self-Report Delinquency Scale (Mak, 1990). In

the first study, psychology students were asked to recruit two male and two female participants each. The psychology students obtained 267 participants of whom 141 were female and 126 were male. The median age of the participants was 16 and socioeconomic status was reported as diverse and sufficient for comparisons, but not representative of the Australian population. Participants in the first study completed only the P and E Scales of the EPQ and the Australian Self-Report Delinquency Scale.

The results of the first study indicated a moderate correlation between self- reported delinquency and the P Scale in the females, $r = .48$, $p < .01$. A similar correlation between self-reported delinquency and the P Scale ($r = .45$, $p < .01$) was also obtained for males. However, there was no significant correlation between self-reported delinquency and the E Scale in females ($r = .06$, p = ns) nor in males ($r = .09$, p = ns). Thus, the results of the first study only partially supported Eysenck's hypothesis.

The second study conducted by Heaven (1993) was similar to the first, but differed slightly in the instrumentation and sample used. Respondents for the second study were tenth graders with a median age of 16. The participants, 211 females and 175 males, were attending four Catholic high schools in New South Wales. They completed the P and E Scales of the EPQ plus the L Scale and the Australian Self-Report Delinquency Scale.

The results of the second study included a modest correlation between self-reported delinquency and the P Scale in both females ($r = .33$, $p < .01$) and males ($r = .42$, $p < .01$). In contrast to the first study, a significant correlation was obtained between the E Scale and self-reported delinquency in both females ($r = .23$, $p < .01$) and males ($r = .20$, $p < .01$). Further, the L Scale was negatively correlated with self-reported delinquency in both females ($r = -.43$, $p < .01$)

and males (r = -.16, p < .05). Thus, the second study supported Eysenck's hypothesis relative to the P, E, and L Scales.

Ma, Shek, Cheung, and Lee (1996) conducted a large-scale study of personality in relation to prosocial and antisocial behavior in secondary school students in Hong Kong. Participants (N = 2,862) in the study were recruited from 20 schools and included seventh through tenth graders, 1,231 males and 1,631 females, with a mean age of 14.25 (SD = 1.41). Participants completed the following measures: the Adolescent Behavior Questionnaire (ABQ), the Peer Interaction Questionnaire (PIQ) and the Chinese version of the JEPQ. The ABQ (Ma, 1988) is an adolescent self-report scale designed to measure antisocial or delinquent behavior and prosocial behavior using 65 behaviors rated on a seven-point Likert scale.

The results of the study supported Eysenck's hypothesis for the P, E, N, and L Scales. Ma et al. (1996) correlated delinquency scores on the ABQ with the P, E, N, and L Scales of the JEPQ. Simple and partial correlation was computed. The difference between the simple and partial correlation was negligible and did not affect significance levels, so partial correlation will not be reported. Delinquent behavior had the highest correlation with the P Scale (r = .513, p < .001), followed closely by an inverse correlation with the L Scale (r = -. 444, p < .001). Delinquent behavior was also significantly correlated with the N Scale (r = .513, p < .001) and E (r = .215, p < .001).

Summary

Support for Eysenck's ABD hypothesis appears to be quite strong (see Table 1). Six of 20 studies (30%) found elevated levels of P, E, N, and depressed L as predicted (Berman, & Paisey, 1984; Eysenck, 1981; Gabrys et al., 1988; Ma et al., 1996; McEwan, 1983; McEwan, & Knowles, 1984). Seven of 20 studies (35%) support Eysenck's ABD hypothesis on three of the

four predictions (Gabrys, 1983; Heaven (part 2), 1993; Lane (part 1), 1987; McGurk & McDougall, 1981; Saklofske et al., 1978; Saklofske & Eysenck, 1980; Slee & Rigby, 1993). Three of 20 studies (15%) supported the hypothesis on 2 of the four predictions (Lane (part 2), 1987; Powell & Stewart, 1983; Silva et al., 1986). Three of the 20 studies (15%) found support for one of the predictions (Chico & Ferrando, 1995; Fonseca & Yule (part 2), 1995); Heaven (part 1), 1993). Only one study (5%) found no support for any of the predictions (Fonseca & Yule (part 1), 1995). None of the studies reported contrary findings for the P Scale. One study

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Insert Table 1

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(Silva et al., 1986) had a contrary finding for the E Scale. Two studies (Lane (parts 1 & 2), 1987) had contrary findings for the N Scale. One study (McGurk & McDougall, 1981) had a contrary finding for the L Scale. In all other cases the lack of support was due either to a neutral finding or failure to evaluate or report data for one or more of the scales.

Thus, 95% of the studies evaluating the P Scale prediction (N = 20) supported it with no contrary findings for this scale. The E Scale prediction was supported by 65% of the studies evaluating it (N = 20) with a contrary finding in 5% of the studies. The N Scale prediction was supported by 67% of the studies evaluating it (N = 18) with 11% reporting contrary findings. Finally, 72% of the studies evaluating the L Scale (N = 18) supported the prediction with 11% reporting a contrary finding.

Discussion

This review found moderate support for elevated E and N Scale scores in subjects with verified, teacher-identified, or self-reported antisocial behavior. Very strong support was found for the P Scale and strong support for the L Scale. The most important component in the ABD hypothesis is represented by the P Scale (Eysenck, 1977). The L Scale plays a confirmation role in the ABD hypothesis whereby a low score on this scale suggests that an individual's socialization has probably not been adequate to constrain his or her predisposition for developing antisocial behavior. The E and N Scales represent contributing factors in the development of antisocial behavior. Extroversion contributes a predisposition for impulsive and sensation seeking behavior. Neuroticism contributes emotional intensity to antisocial behavior.

Since both E and N are contributing rather than primary components in the hypothesis one would expect weaker support for elevated E and N scores in subjects with ABD. Further, the P, E, and N Scales are orthogonal, and elevation on one scale is independent of elevation on another scale (Eysenck, 1975; Monte, 1995). Also, given the orthogonality of the scales one would expect, on a statistical basis, to find far more individuals high on one scale than on two scales, on two scales than on three scales, and on three scales than all four scales. Thus, the ABD population is not likely to be temperamentally homogeneous (Eysenck & Gudjonsson, 1989). Variability among children and adolescents with ABD on the E and N Scales should be expected.

Eysenck's ABD hypothesis is a complex hypothesis which goes beyond simply suggesting that antisocial behavior is a direct result of temperamental predisposition reflected by P, E, and N Scale scores. Eysenck suggests that other factors interact with temperament, including general intelligence (g) and environmental factors (Eysenck & Gudjonsson, 1989) to produce personality and behavioral styles. For example, Eysenck indicates that above average g provides a degree of protection from the negative aspects of P and increases the likelihood that positive aspects of this

predisposition, e.g., creativity will be facilitated (Eysenck, 1995). In particular, it is suggested that below average g leads to academic difficulties and that these difficulties in interaction with high P increase the probability that such an individual will make antisocial adaptations to the educational environment and subsequently to the broader social environment. Thus, future studies need to control for intellectual ability and school success when examining the effects of P on the development of antisocial behavior. While not a part of the ABD hypothesis, it seems reasonable to expect that students who have above average g, high P, and learning disabilities would be at greater risk than a similar student without learning disabilities for developing an ABD.

The other major influence on the development of ABD that needs to be better controlled in future studies is the role of environment, e.g., home and community in interaction with temperamental predisposition. Eysenck's proposition concerning the role of E in the development of ABD is that one major aspect of E relates to an individual's susceptibility to conditioning. When E is elevated an individual has low cortical arousal which reduces susceptibility to conditioning and makes it more difficult to establish conditioned restraints on behavior. Conversely, when E is depressed an individual has high cortical arousal that increases susceptibility to conditioning. These tendencies in children would clearly interact with both parenting skill and the quality of the community or social environment. A parent trying to appropriately socialize a high E child will have a more difficult task than the parent of a low E child and will need greater skill and support to be successful. In this regard, Eysenck suggests that a home with a lower education level, few economic resources, and a single parent will be less successful in socializing a high E child and particularly one also high on P. Further, the influence of a poor social environment will, in all cases, make socialization more difficult. Conversely, the

influence of a good social environment will, in all cases, make socialization easier. There is also some evidence that low E could potentially work against appropriate socialization if the socialization experiences are inappropriate (Raine & Venables, 1981). In such cases, a low E child may more easily learn inappropriate adaptations, when specifically promoted, by parents, the community environment, or both, than children higher on E. Thus, future studies should attempt to control for quality of parenting and of the community or social environment, particularly when attempting to assess the effects of the E trait and of the interaction of the E and P traits on antisocial behavior.

As suggested earlier, one possible influence on the anomalous results in the first Fonseca and Yule (1995) study was that they used a control group comprised of participants, from an inner city environment, who had no record of convictions but were not evaluated any further for behavioral normalcy. Use of a self-report delinquency scale or a parent/teacher behavior rating scale might have revealed significant behavioral deviance in some members of their control group. Thus, control groups should probably be evaluated for their degree of behavioral normalcy before comparing them to groups comprised of participants with deviant behavior, e.g., conduct disorder and delinquency.

In conclusion, Eysenck's ABD hypothesis and the associated theory of personality and instruments to assess personality appear to have sufficient support in children and youth to warrant further investigation. In particular, predictive studies based on longitudinal data are needed to determine how accurately the model can predict maladaptive outcomes in children. The only study to date that has data reflecting on this issue is Lane's (1987) study in which delinquency five years hence was predicted by EPQ profiles. If the ABD model proves to be as accurate at predicting future maladjustment as the available data suggests, it has considerable

potential for identifying at-risk children during the early school years. Studies would then be needed to determine if preventive programming, particularly parent training, parent support programming, and teacher training directed at effective socialization practices, could effectively reduce the predicted level of maladaptive outcomes.

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Table 1

Summary of Research Findings on Eysenck's Antisocial Behavior Disorder Hypothesis (plus (+) = significant in the predicted direction, minus (-) = significant in the direction opposite to prediction, and nr/ne = not reported or neutral relative to prediction).

		P			E			N			L	
Behavioral Criterion Studies	+	-	nr/ne	+	-	nr/ ne	+	-	nr/ ne	+	-	nr/ ne
Saklofske et al. (1978)	X			X			X					ne
Saklofske & S. Eysenck (1980)	X			X[1]					ne	X[2]		
McGurk & McDougall (1981)	X			X			X				X	
Gabrys (1983)	X					ne	X			X		
McEwan (1983)	X			X			X			X		
McEwan & Knowles (1984)	X			X			X			X		
Berman & Paisey (1984)	X			X			X			X		
Silva et al. (1986)	X				X		X					nr
Lane (1987) (part 1)	X			X				X		X		
Lane (1987) (part 2)	X					ne		X		X		
Gabrys et al. (1988)	X			X			X			X		
Chico & Ferrando (1995)	X					nr			nr			nr
Fonseca & Yule (1995) (part 1)			ne			ne			ne			ne
Fonseca & Yule (1995) (part 2)			ne			ne	X					ne
Rating Scale Studies												
S. Eysenck (1981)	X			X			X[3]			X		
McGurk & McDougall (1981)	X			X			X				X	
Powell & Stewart (1983)	X					ne			ne	X		
Slee & Rigby (1993)	X			X[4]					ne	X[5]		
Heaven (1993) (part 1)	X					ne			nr			nr
Heaven (1993) (part 2)	X			X					nr	X		
Ma et al. (1996)	X			X			X			X		

1. Badly behaved but not delinquent subjects were significantly higher than the well-behaved subjects.
2. Badly behaved but not delinquent subjects were significantly lower than the well-behaved subjects.
3. Prediction supported in female subjects but not in males.
4. Bullies and normal subjects were both significantly higher than victims.
5. Bullies were significantly lower than victims were but not significantly lower than normal subjects.